

LISTING OF CLAIMS

(1) - (10) (canceled)

(11) (currently amended) A ~~The~~ speech recognition method for causing a speech recognition device configured to include a computer to perform speech recognition the method causing the speech recognition device to execute steps of:

storing in a storage area a feature quantity acquired from a current speech signal for each frame;

reading from said storing area a speech signal acquired immediately prior to a current speech signal to be processed at the current time point to generate echo speech model data;

processing a speech model stored in a storing portion using an echo adaptation model generating portion for generating echo speech model data from a speech signal acquired immediately prior to the current speech signal;

generating an affected speech model, affected by
intra-frame echo influence, using acoustic model data
and an intra-frame characteristic common to said
current speech signal and said speech signal acquired
immediately prior to the current speech signal by
steps of transforming cepstrum acoustic model data
into linear spectrum acoustic model data by adding
cepstrum acoustic model data of said acoustic model
and cepstrum acoustic model data of an intra-frame
transfer characteristic to generate the affected
speech model;

adding the echo speech model data to the affected
speech model to generate adapted acoustic speech model
data;

adding said linear spectrum acoustic model data and
said echo speech model data to generate a maximum
likelihood echo prediction coefficient wherein the
step of generating said echo prediction coefficient
comprises a step of determining the echo prediction
coefficient so that the maximum likelihood is given to
at least one phoneme for which the sum value of the
linear spectrum echo model data of said speech model

affected by intra-frame echo influence and said echo speech model data, which has been generated by said adding portion and stored; and

processing said feature quantity, said adapted acoustic speech model data, and language model data stored in a storing portion to generate a speech recognition result of the current speech signal.

- (12) (currently amended) A computer-readable program embodied in a computer readable storage medium for causing a computer to execute the speech recognition method comprising the steps of:

storing in a storage area a feature quantity acquired from a current speech signal for each frame;

reading from said storing ~~area portion~~ a speech signal acquired immediately prior to a current speech signal to be processed at the current time point to generate echo speech model data;

processing a speech model stored in a storing portion using an echo adaptation model generating portion for

generating echo speech model data from the speech signal acquired immediately prior to the current speech signal to be processed at the current time point ~~and using the echo speech model data to generate adapted acoustic speech model data and store it in a storage area;~~

generating an affected speech model, affected by intra-frame echo influence, using acoustic model data and an intra-frame characteristic common to said current speech signal and said speech signal acquired immediately prior to the current speech signal by steps of transforming cepstrum acoustic model data into linear spectrum acoustic model data by adding cepstrum acoustic model data of said acoustic model and cepstrum acoustic model data of an intra-frame transfer characteristic to generate the affected speech model;

adding the echo speech model data to the affected speech model to generate adapted acoustic speech model data;

adding said linear spectrum acoustic model data and
said echo speech model data to generate a maximum
likelihood echo prediction coefficient wherein the
step of generating said echo prediction coefficient
comprises a step of determining the echo prediction
coefficient so that the maximum likelihood is given to
at least one phoneme for which the sum value of the
linear spectrum echo model data of said speech model
affected by intra-frame echo influence and said echo
speech model data, which has been generated by said
adding portion and stored; and

processing said feature quantity, said adapted
acoustic model data, and language model data stored in
a storing portion to generate a speech recognition
result of the current speech signal.

(13) (canceled)

14. (previously presented) The speech recognition
method according to claim 11 further comprising the
steps of:

using the determined echo prediction coefficient and read speech signal to acquire value of an echo as the echo speech model data.

15. (currently amended) The speech recognition method according to claim 7 11 wherein said storing comprises steps of:

transforming a received current speech signal into a digital signal; and

storing said transformed signal with amplitude associated with a ~~at~~ time frame.

16. (currently amended) The speech recognition method according to claim ~~9~~ 11 wherein said echo prediction coefficient is calculated for at least one of a particular signal receiving device, a level of recognition efficiency, a level of recognition speed, and each state of a Hidden Markov Model.

(17) (new) A speech recognition device configured to include a computer, the speech recognition device comprising:

a storage area for storing a feature quantity acquired from a current speech signal for each frame;

storing portions for storing acoustic model data and language model data, respectively;

an echo adaptation model generating portion for generating echo speech model data from a speech signal acquired immediately prior to a current speech signal to be processed at the current time point and using the echo speech model data;

an adapted acoustic model generating means comprising a model data area transforming portion for transforming cepstrum acoustic model data into linear spectrum acoustic model data; an adding portion for generating echo speech model data wherein said adding portion adds the cepstrum acoustic model data of said acoustic model and cepstrum acoustic model data of an intra-frame transfer characteristic to generate a speech model affected by intra-frame echo influence, wherein said adding portion inputs said generated speech model affected by intra-frame echo influence

into said model data area transforming portion and causes said model data area transforming portion to generate linear spectrum acoustic model data of said speech model affected by intra-frame echo influence;

an echo prediction coefficient calculating portion for adding said echo speech model data to said linear spectrum acoustic model data to generate a maximum likelihood echo prediction coefficient wherein said echo prediction coefficient calculating portion uses at least one phoneme acquired from an inputted speech signal and said echo speech model data to maximize likelihood of the echo prediction coefficient based on linear spectrum speech model data; and

recognition processing means for utilizing said feature quantity, said adapted acoustic model data and said language model data to provide a speech recognition result of the current speech signal.